



Global Climate Change: "Weather" or Not

GOT BOOTS?

You'll probably need them this winter in Washington State, no matter which side of the mountains you live on. The El Niño weather system that has brought warmer, wetter weather, flooding, and windstorms to some areas and drought or heavy snowfall to others is back again. Is El Niño just a foretaste of a changed future climate resulting from increased levels of greenhouse gases? Most scientists believe so.

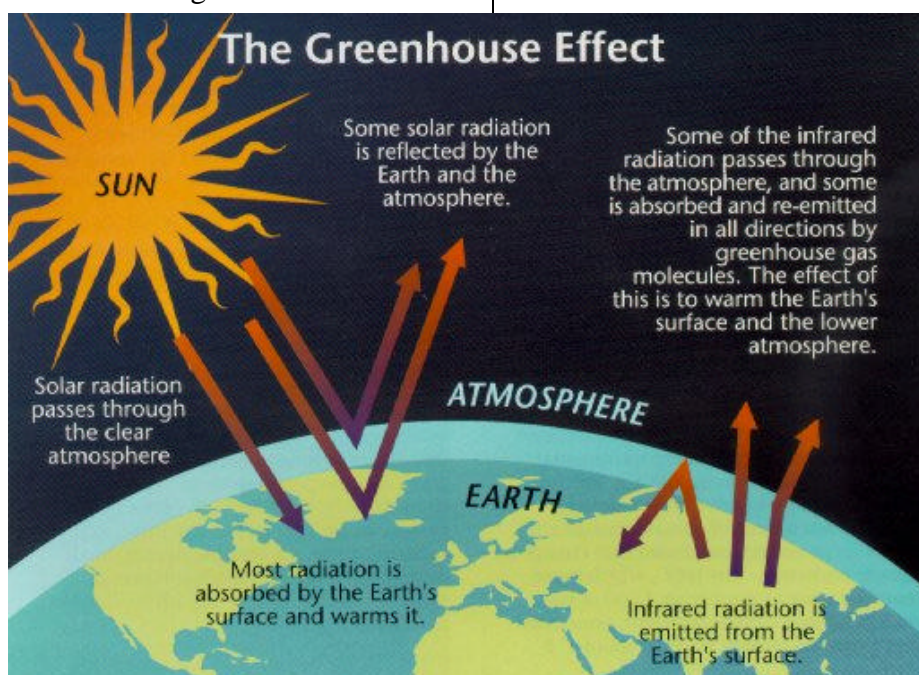
This December, representatives from around the world will meet in Kyoto, Japan to decide whether to change the 1992 international climate control treaty on global warming. This treaty called for industrialized nations to voluntarily reduce the amount of greenhouse gases (gases that trap the sun's heat close to the earth) they release in order to slow global warming. However, little progress has been made in reducing emissions of these gases. This has prompted some governments and many in the scientific community to call for

legal limits on the amount of greenhouse gases these countries can release.

Is the world's climate really changing?

Most scientific experts agree that people are changing the earth's climate. However, there is disagreement about how and to what extent the climate may be changing. In some areas, it appears that concentrations of some chemicals in the air may have a cooling effect on the

atmosphere. But the most widely held belief among scientists around the world is that global temperatures are increasing. The Intergovernmental Panel on Climate Change, a group of over 1,000 scientists from 25 countries, agrees that greenhouse gases are accumulating in the atmosphere. The Panel also agrees that this accumulation of greenhouse gases may cause the average global temperature to gradually increase about two to nine degrees Fahrenheit over the next century. This warming could significantly



change wind, precipitation, and other climatic patterns.

What is the “greenhouse effect?”

Greenhouse gases include carbon dioxide, methane, and chlorofluorocarbons. These gases trap the sun’s heat as it is radiated from the earth and prevent it from escaping back into space. (See the picture on page 1.) Anyone who has parked his or her car in the sun for a few hours has experienced something like the greenhouse effect. The sunlight pours through the glass windows and heats up the inside of the car; but the glass doesn’t let the heat back out again. The heat can’t escape because the sides, floor, and roof of the car are closed. The earth has a natural greenhouse effect that keeps it about 60 degrees Fahrenheit warmer than it would be otherwise. This enables us to live comfortably on the earth. But human activities have added to the natural greenhouse effect by releasing more greenhouse gases into the air.

What causes greenhouse gases?

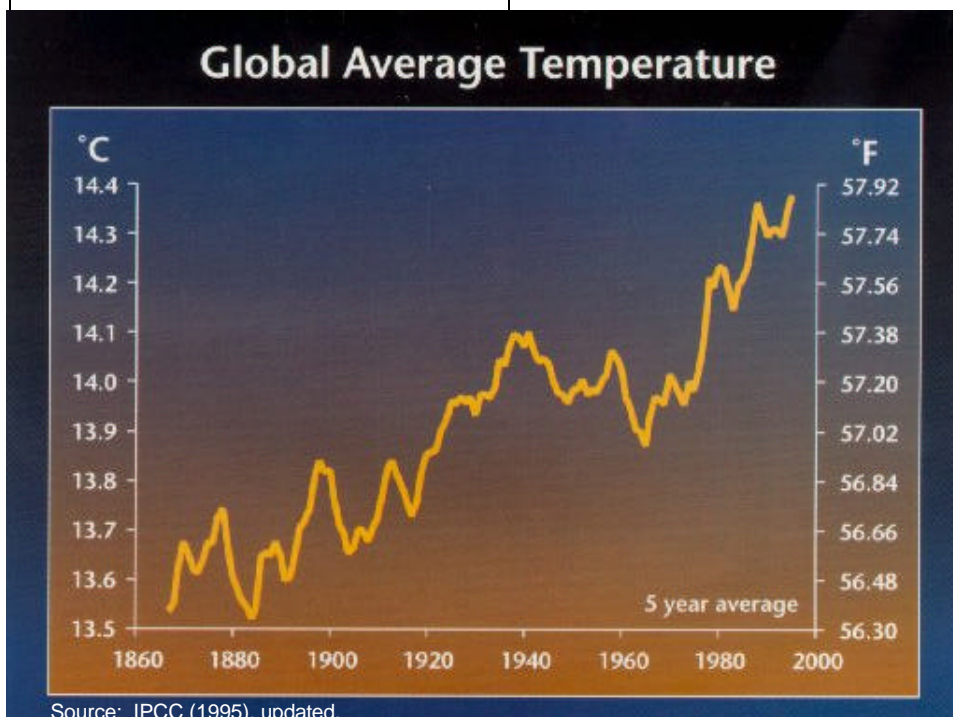
Burning of coal, oil, and natural gas is the main source of greenhouse gas emissions. Changing land use patterns through agriculture and deforestation also contributes greatly. Trees and other plants use carbon dioxide and give off oxygen. When trees are cut down for agriculture and other purposes, they not only can’t use up the carbon dioxide in the air, they

release it when they decay or are burned.

The United States is the world’s largest source of greenhouse gases. We have four percent of the world’s population, but contribute 22 percent of the carbon. However, current trends seem to show that developing areas (such as South America, Mexico, and parts of Asia) could exceed emissions from the

century since at least 1400 A.D. The last few decades have been the warmest.

Probably as a result of this temperature increase, mountain glaciers have retreated worldwide this century. Sea level has risen about 4 to 10 inches as well. Precipitation has increased in higher latitudes and decreased in the tropics over the last century. Intense rainstorms and



developed world (Europe, the United States, Japan, etc.) in about 30 years.

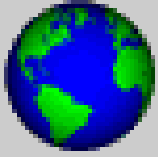
What does global warming do to the earth?

The surface temperature of the earth has increased by about 1 to 1.5 degrees Fahrenheit over the last century, corresponding with increased industrialization. The temperature this century is as warm as or warmer than any other

snowstorms have become about 10 percent more frequent in the United States and southern Canada during the 20th century. The number of intense cyclone-type storms per winter has also been increasing in recent years.

Because many greenhouse gases stay in the atmosphere for a long time, the warming effects from these gases will probably last a long time as well. Even if concentrations of greenhouse gases stopped increasing now,

(continued on page 3)



Lifestyles

In addition to government, we as individuals can reduce emissions of greenhouse gases by changing some of the things we do. Here are some suggestions:

- ❖ Drive less. Use buses or carpools, work at home, bicycle, or walk.
- ❖ Buy more energy efficient vehicles to help reduce use of fossil fuels.
- ❖ Use manual or electric lawn and garden equipment.
- ❖ Keep cars tuned and tires properly inflated to conserve fuel.
- ❖ Use energy-efficient appliances and lighting.
- ❖ Buy products with reusable, recyclable, or reduced packaging to save the energy required to manufacture new containers.
- ❖ Use non-fossil energy, such as solar power and wind power.
- ❖ Weatherize homes and other buildings to conserve energy. Have a home energy audit to find out how to make your home more energy efficient.
- ❖ Plant trees.

(continued from page 2)

the earth's temperature would probably continue to grow warmer for several decades.

How could global warming affect people and the environment?

Many scientists predict that warming of the oceans and melting of glaciers due to global warming could cause sea levels to rise between 6 and 38 inches by the year 2100. Floods and drought could become more frequent and more severe. These and other changes such as changes in precipitation and soil moisture could affect human health, natural ecosystems, agriculture, forestry,

water resources, energy use, transportation, and many other aspects of human life.

What about Washington State?

Some potential effects of global warming in Washington State include:

- ❖ A perpetual El Niño-like state, with higher temperatures, wetter winters, and drier summers. This would mean more flooding in winter and spring, but more water shortages in late summer and fall.
- ❖ A rise in sea level resulting in submersion of low-lying parts of coastal highways and land, increased coastal erosion, changes in habitat, and saltwater intrusion into freshwater habitat.

- ❖ More frequent and severe landslides due to flooding and coastal erosion.
- ❖ Less snow-pack, resulting in lower flows in the Columbia River/Snake River system. This would lead to reduced hydropower, less water for irrigation, endangered salmon stocks, and less wetland habitat.
- ❖ Increased risk of extinction for salmon and other marine life, as ocean temperatures rise, nutrient levels drop, and habitat changes. Freshwater fish could also suffer.
- ❖ Loss of forestland resulting from forest fires, windstorms, and insect infestations.
- ❖ A possible increase in human diseases, as warm weather boosts tick and other parasite populations and fosters the spread of viruses and bacteria.
- ❖ More difficulty in meeting air quality standards for ozone and particulate matter.

On the positive side, other effects could include:

- ❖ An increased market for energy-efficient technologies.
- ❖ Increased opportunities for development of alternative energy sources and associated technologies.
- ❖ A longer growing season resulting from higher temperatures, which could increase the region's agricultural productivity.

What is being done about global climate change?

In Washington State, the 1991 Washington Clean Air Act

(continued on page 4)

(continued from page 3)

indirectly addresses global warming through programs designed to reduce emissions of traditional air pollutants. These programs include:

- ❖ limiting traffic growth through providing options other than single occupant vehicles;
- ❖ encouraging the use of alternative fuels in motor vehicles;
- ❖ regulating outdoor burning;
- ❖ implementing strict standards for wood stove and fireplace emissions and encouraging cleaner burning practices for wood stove and fireplace users;
- ❖ regulating industrial emissions of air pollutants; and
- ❖ regulating chlorofluorocarbons (CFCs) used as coolants, solvents, blowing agents, and other purposes. (Federal law also banned the production of CFCs by the year 1996.)

In addition, environmental and scientific groups have suggested the following as ways for government to more actively address the problem of global climate change:

- ❖ Improve energy efficiency and tighten energy codes for residential, commercial, and industrial buildings.
- ❖ Establish carbon taxes or fuel use standards.
- ❖ Establish a tradable emissions permit program for industrial sources of greenhouse gases. Permits would be required in order to sell or use fossil fuels. This would allow industries to buy, sell, and trade carbon dioxide emissions permits.
- ❖ Provide incentives for development and use of renewable fuels. Incorporate climate change concepts into permit decisions or rule changes without compromising traditional clean air goals.
- ❖ Implement a continuous, aggressive, multi-media education and outreach program to raise public awareness of global climate issues.

For suggestions about what you as an individual can do to reduce emissions of greenhouse gases, [see the Lifestyles column on page 3.](#)

Air Lines is published quarterly and offers updated information on the Clean Air Washington Act and other Air Quality Program activities. *Air Lines* welcomes your comments. Questions and contributions should be directed to:

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EDITOR'S NOTE

The Department of Ecology regrets any confusion caused by the photo caption in the [August 1997 issue of *Air Lines*](#) (page 1). Spokane has not violated the current federal air quality standard for ozone, and is expected to meet the new ozone standard as well.